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ARMY TECHNICAL INTELLIGENCE REVIEW

UNCLAS



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OCTOBER 1972

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Cover PictureSAGGER BRDM

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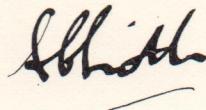
1. *Do you do both?*

ARMY TECHNICAL INTELLIGENCE REVIEW No. 102

FOREWORD

This time we have quite a wide variety of items of interest. In particular the appearance of two new Soviet tanks at the same time is quite an event. We have been expecting a new Soviet medium tank to appear for some while and this may well be it. Air Defence is of course taken very seriously by the Soviets and the updating article on low level air defence guns is very timely.

This year has seen considerable Staff changes in the Branch. Recent new members are Major David Boobyer who took over the Artillery desk from Major Argie Haddock in June and Major Richard Karl who is now looking after the Signals desk vice Major John Stevens who has now joined the Staff of the School of Signals. Finally Col Bill Fairbairn will have taken over the reins of office (on 7 September) from me by the time this issue is published. I wish him every success in a most interesting appointment.



S C SMITH
Colonel Tech Int (A)

1. New Soviet Tanks

General

It is now 11 years since the T-62 medium tank was first sighted and the PT-76 amphibious tank has been in service for 20 years. In view of this it was no surprise when photographs of a new Soviet medium tank and a new Soviet light amphibious tank came into our possession. These two tanks have been titled the Medium Tank M 1970 and the Light Tank M 1970.

Fig 1 MEDIUM TANK M 1970

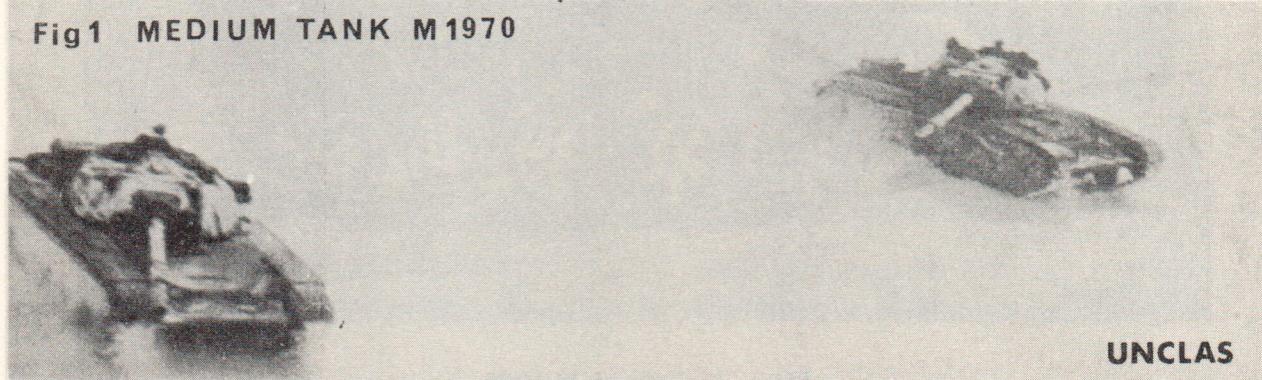


Fig 2 MEDIUM TANK M 1970



Medium Tank M 1970 (Figs 1 and 2) From the sparse photography available at present it is difficult to draw many conclusions about the Medium Tank M 1970. It is obvious, however, that its general design follows that of most conventional post World War II battle tanks. Apart from this the following features are fairly evident:

- a. The gun has a central fume extractor and could be the 115 mm smooth-bore as fitted to the T-62. (Figs 1 and 2)
- b. The turret appears to be further to the rear than on the T-62. (Fig 2)
- c. The glacis plate appears to be at a shallower angle, probably nearer 70°, than the 60° glacis of the T-55 and T-62. (Figs 1 and 2)
- d. The driver would appear to be central in the hull instead of on the right as on previous Soviet medium tanks (Fig 1)
- e. The flat track system with large road wheels used on all Soviet medium tanks since the T-34 has been replaced by one akin to that used on the heavy tanks of the JS and T-10 series, ie small road wheels and return rollers. (Fig 2)

Light Tank M 1970

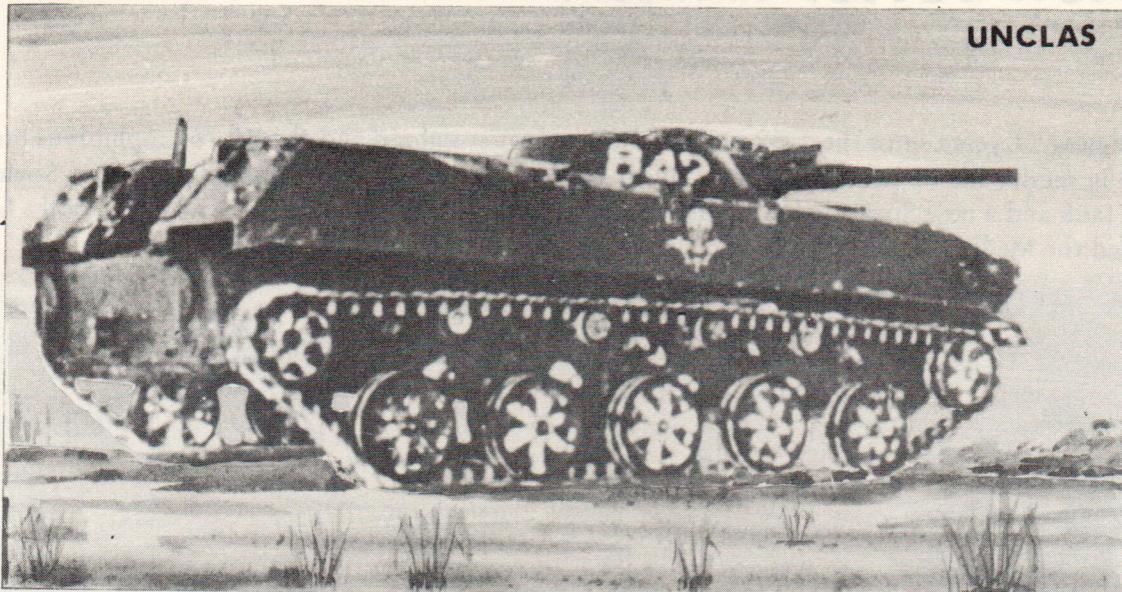


Fig 3. Light Tank M 1970

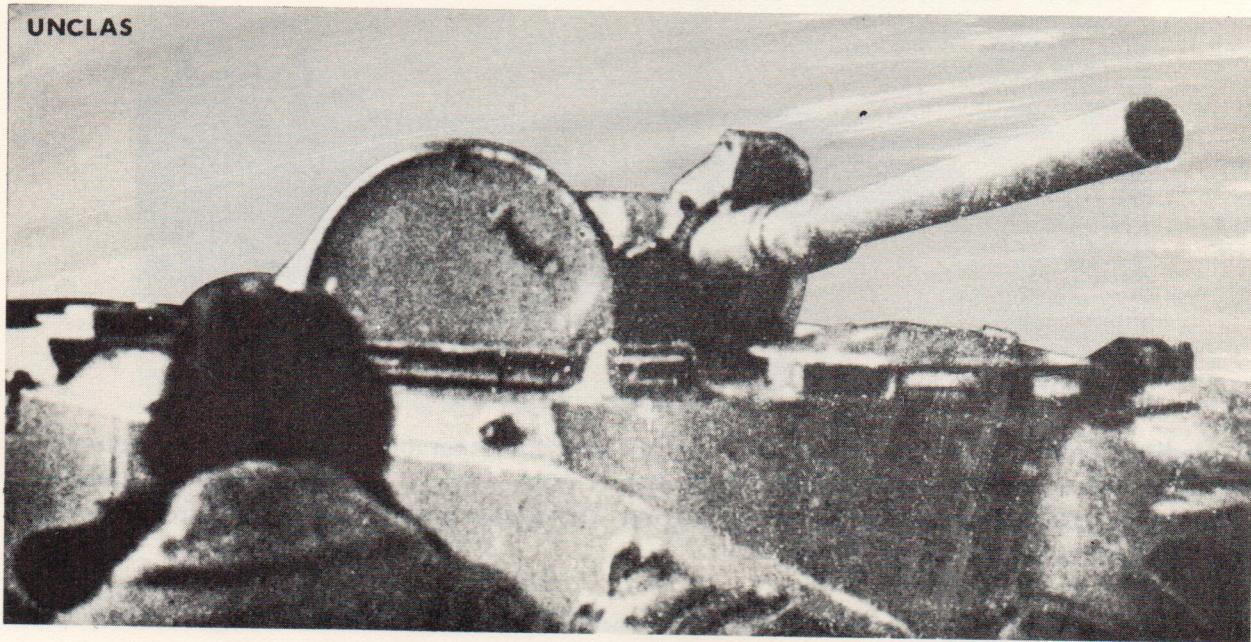


Fig 4. Light Tank M 1970

Light Tank M 1970. (Figs 3 and 4) Again, there is not enough photography for a detailed analysis of this tank but the following points can be gleaned from these photographs:

- a. The turret appears to be identical to that of the BMP with its 76 mm gun and SAGGER launch rail. (Figs 3 and 4)
- b. The engine is probably behind the turret as the tank has a rear sprocket. (Fig 3)
- c. The water jet doors can be seen on the rear hull plate showing that the Soviets have continued their policy of making all light AFVs amphibious. (Fig 3)

2. Non Soviet Warsaw Pact Air Defence Guns

The last Restricted article on Air Defence was in ATIR 90 in July 1968 entitled 'Soviet Low Level Air Defence'. It is intended in this article to cover those low level air defence guns manufactured by Warsaw Pact countries other than Russia.

The tactics and training of Warsaw Pact air defence units are the same as those practised by the Soviet Union. A large amount of AA equipment found in the Warsaw Pact is Soviet. However, Czechoslovakia and Yugoslavia manufacture some of their own air defence equipments which are subsequently seen in other countries round the world.

CZECH GUNS

12.7 mm AA Heavy Machine Gun M-53 This four barreled 12.7 mm AA gun (Fig 1) which bears some resemblance to the Soviet ZPU 4 except that it is mounted on one axle rather than the two on ZPU 4, is no longer in the Czechoslovakian Army but has been exported to Egypt and Cuba and elsewhere in the world. The barrels are Soviet designed 12.7 mm DShK heavy machine guns, and the weapon has a cyclic rate of fire of 40 rounds per second with a maximum effective range of 1,000 metres. It has a detachment of 6 and fires ammunition fed from 50 round belts which are housed in the very prominent drums.

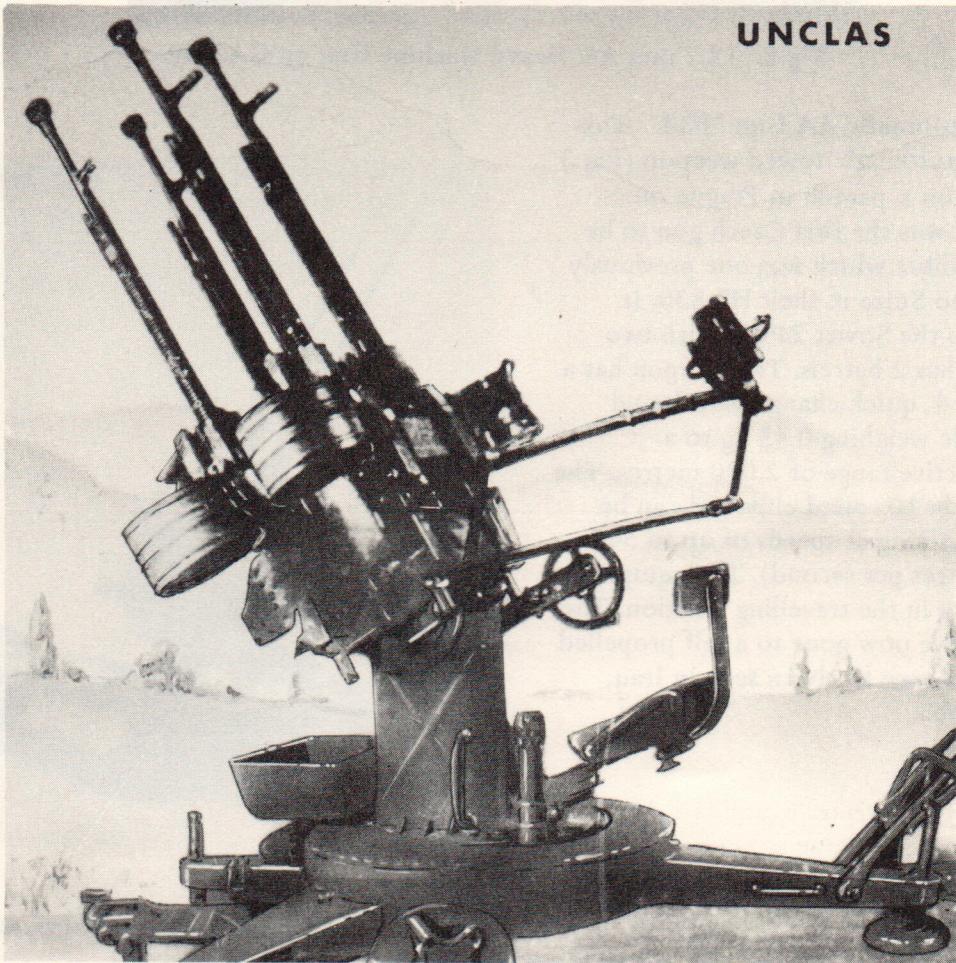


Fig 1. 12.7 mm AA Heavy Machine Gun M-53

Czech Guns (cont'd)

12.7 mm AA Heavy Machine Gun on GAZ 69 This twin barrelled weapon (Fig 2) was first seen in Prague on a parade on 9 May 1970 and the individual barrels are thought to have a similar performance to those of the 12.7 mm Quad M53. Different square ammunition drums can be seen.



Fig 2. 12.7 mm AA Heavy Machine Gun on GAZ-69

30mm Twin Automatic AA Gun M-53 This twin barrelled automatic towed weapon (Fig 3) first appeared on a parade in Prague on 9 May 1958. It was the first Czech gun to be made of this calibre which was one previously used by Hispano Suiza in their HS 830. It looks similar to the Soviet ZPU 4 with two axles but only has 2 barrels. The weapon has a detachment of 4, quick change barrels and fires a projectile weighing 0.45 kg to a maximum effective range of 2,000 metres. The ammunition is in 10 round clips and can be fired at targets flying at speeds of up to 540 knots (277 metres per second). The equipment weighs 2,100 kg in the travelling position. The Czech Army have now gone to a self propelled version but this type has been seen in Iraq, Uganda and Cuba.

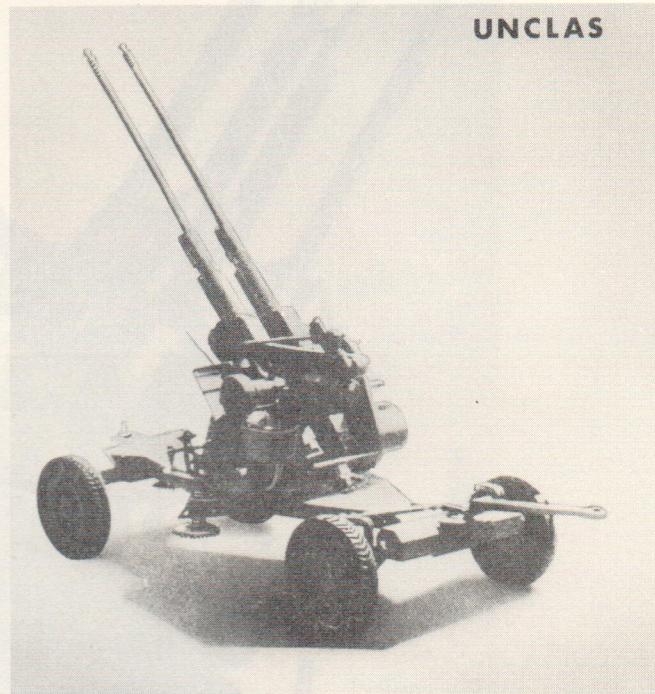


Fig 3. 30 mm Twin Automatic

AA Gun M-53

Czech Guns (cont'd)

30 mm Self Propelled AA Gun M-53/59 This self propelled twin AA gun (Fig 4) was first seen on a parade in Prague in 1960 mounted on a PRAGA V3S and another version on a BTR 60P has also been reported. This weapon is in service with the Czech Army and has also been seen in Cuba and Yugoslavia. The performance is similar to the 30 mm AA Gun M-53 and the equipment is estimated to weigh about 9,500 kg.



Fig 4. 30 mm Self Propelled AA Gun M-53/59

30 mm Self Propelled AA Gun M-53/70 This twin barrelled weapon is believed to be an improved version of M-53/59. It is thought to be able to fire at targets travelling at speeds of up to 540 knots (277 metres per second) to a maximum effective range of 2,500 metres.



Fig 5. 57 mm AA Gun M-57

57 mm AA Gun M-57 This weapon (Fig 5) is very like the Soviet 57 mm S60, but the suspension is different. It is deployed in the same way as S60 with FIRECAN Radar and a director or FLAP WHEEL Radar. The ammunition is not the same as that for the S60 being in 3 round clips. The projectile weighs about 2.5 kg and the muzzle velocity is about 1,000 metres per second. The maximum effective range is about 6,000 metres and the equipment weighs about 5,150 kg, slightly heavier than the Soviet 57 mm S60 which weighs about 4,800 kg. Otherwise the two equipments have almost the same performance.

Czech Guns (cont'd)

85 mm AA Gun This weapon (Fig 6) is not seen in the Czechoslovak Army but has been seen in Egypt and is thought to be in other countries as well. It is very similar to the Soviet 85 mm AA Gun KS 12 except that the muzzle brake is different. The weapon weighs about 4,300 kg, the projectile about 9.6 kg, and the maximum effective range is about 9,000 metres.

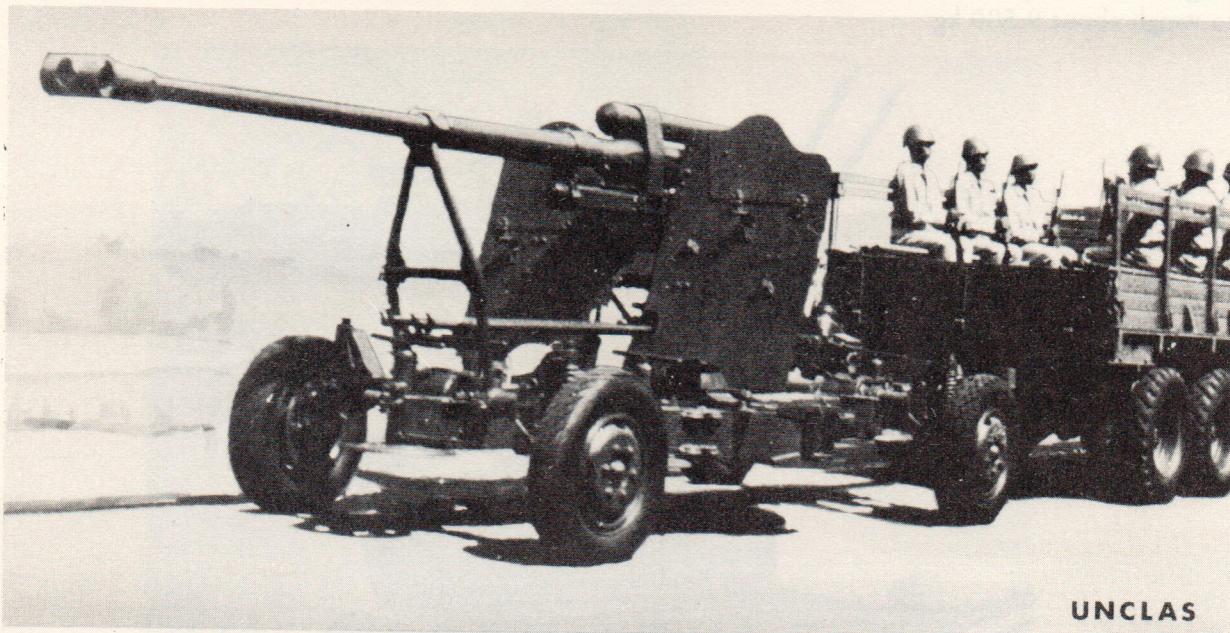


Fig. 6. 85 mm AA Gun

YUGOSLAV GUNS

20 mm Automatic Light AA Gun M-55

This triple barrelled weapon (Fig 7) is the only AA gun made in Yugoslavia. It appears to be similar to the Hispano Suiza 820/630-3 which was made under licence but there may be modifications. It is believed to weigh about 500 kg. The weapon has a muzzle velocity of about 1100 metres per second. It fires a projectile weighing 120 grams to a maximum effective range of 2000 metres. It has been seen in several Middle Eastern countries.

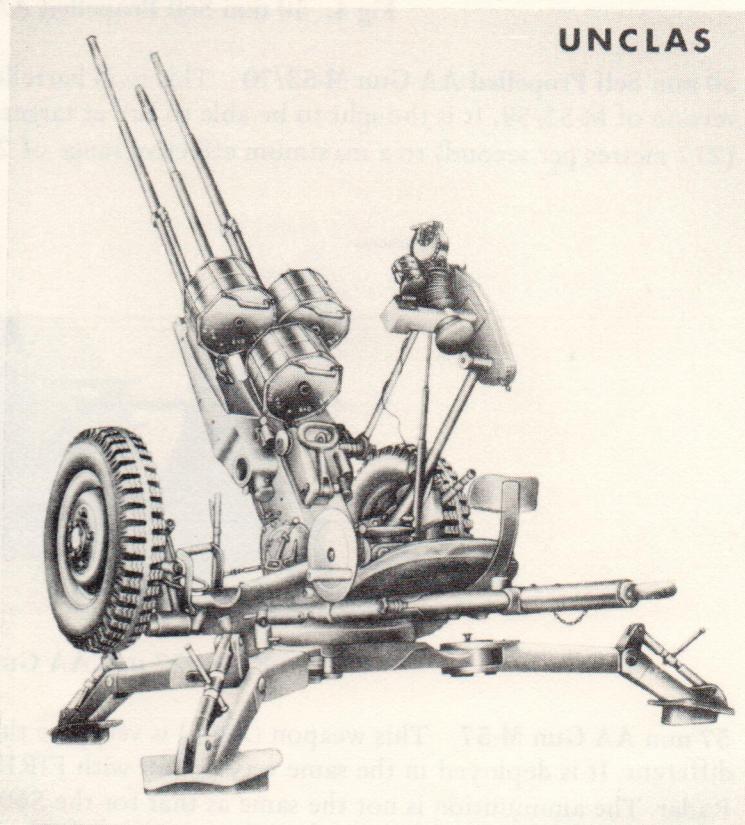


Fig 7. 20 mm Automatic Light AA Gun M-55

3. CROTALE

CROTALE is a French, surface-to-air missile system designed for the all weather interception of low altitude targets.

The complete system comprises up to 3 launch or firing units and an acquisition unit.

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Fig 1. CROTALE Firing Unit

The function of the firing unit is automatic tracking of the target, launching and guidance of the missiles. Each firing unit contains a fire control radar which is able to track one target and can guide simultaneously two missiles against that target. Radar acquisition of the missiles immediately after launch is aided by an infra-red gathering system. Guidance signals are transmitted to the missiles by a radio command link. The twin launcher turret is concentric and slaved to the radar turret. It carries 4 missiles which come containerised and ready for launch. There is also a television tracker which can be used at very low levels in case of radar tracking difficulties.

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The acquisition unit has the task of surveillance, target identification and designation. It includes a surveillance and target designation radar designed specifically for low altitude detection. The automatic target evaluation system gives the weapon system its fast reaction time.

The acquisition unit is linked with the firing units either by cables (up to 400 m) or with a radio link (50-5,000 m). This link transmits target designation data and operational orders and receives operational status data back from the firing units.



Fig 2. CROTALE Acquisition Unit

CROTALE (cont'd)

Each firing unit and the acquisition unit is manned by a Chief Operator, an assistant and a driver. The Chief Operator of the acquisition unit has command of that unit and its associated firing units. In each unit the status of the acquisition and firing sequence is displayed on an operational console. The control panels of the acquisition and firing units are designed for highly automated operation though manual overrides are incorporated.

The missile has a HE directed burst fragmentation warhead weighing approximately 15 kg, which is detonated by an infra-red proximity fuse, although other fuses are being studied. Propulsion is by a single stage solid propellant motor which accelerates the missile to Mach 2.3 in 2.3 seconds.

Main Characteristics

Missile length	2.89 m
Missile diameter	0.15 m
Missile span	0.54 m
Launch weight	approximately 80 kg
Range – maximum	8 kms
– minimum	500 m
Maximum crossing range	3,000 m
Typical target speed	Mach 1.2 at an altitude of 50-3,000 m
Reaction time	6 seconds from first detection of an urgent target to firing of the missile

In order to reduce mechanical vibrations, which can affect the operation of the radar in certain circumstances, the mechanical transmission has been dispensed with in the firing and acquisition units and a very flexible suspension adopted for the vehicle engine. The power supplied by this engine is converted into electrical energy and fed via cables to the electric motors which drive each wheel. This method, together with an elaborate suspension system, results in reduced vibration levels and flexible driving for the CROTALE vehicles. It also has the advantage that the electrical power generated can also be used to operate the electronic equipment installed in the vehicles thus eliminating the need for a separate power system.

The vehicles have a limited cross country performance and are air portable in a C-130 Hercules Aircraft.

Development of the system was based on specifications by the Republic of South Africa who funded a large part of the development costs. CROTALE has not yet reached the end of its development life and improvements are still being incorporated. The missiles delivered to the South Africans (where the system is known as CACTUS) and to the French are currently identical, but as is usual with the incorporation of modifications, the French missiles delivered later may well have differences.

4. The Wheeled Vehicles of the Polish Army

The motor industry in Poland only started to develop during the period following the Second World War. For this reason, in the years immediately following the war, vehicles of Soviet manufacture (primarily from the Moscow based ZIL automobile works and the GAZ factory at Gorkiy) were used in the Polish Armed Forces. Meanwhile the Polish motor industry was steadily building up and, in recent years, an efficient vehicle production has developed which can now almost meet the full military requirement.

Although the earlier home-produced vehicles tended to be adaptations of Soviet models, for example the LUBLIN series (of which the LUBLIN-51 (figure 1), a copy of the Soviet GAZ-51, is the best known military vehicle) and the WARSZAWA Pickup (figure 2) (a military adaptation of the Soviet POBEDA M-20 car), original designs have been produced for the more recent NYSA and ZUK series light vehicles and the STAR medium load-carrying trucks.

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Fig 1. The LUBLIN-51, 2 tonne, 4 x 2, Truck, now replaced in service by STAR models

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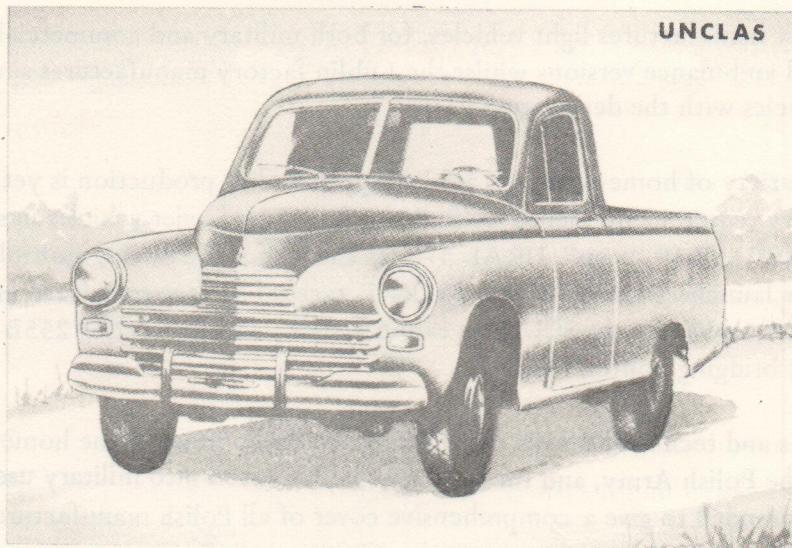


Fig 2. The WARSZAWA Pickup, ½ tonne, 4 x 2, Truck used for administrative duties in the Polish Army

The Wheeled Vehicles of the Polish Army (cont'd)

The first STAR models, STAR-20 and 25, were primarily produced for the civilian market but later models, STAR-27, 28 and 29, the STAR 66/660 series and the most recent STAR-200/244 series have been designed to cover military as well as civilian requirements. The STAR-66/660 series vehicles are the only all wheel drive trucks currently in full production in Poland (the STAR-244, the latest all wheel drive truck, is still at an early stage of development) and these 6 x 6 trucks have in most instances replaced the LUBLIN-51 and Soviet ZIL-151/157 trucks in Polish military service. They have been modified to fulfil many military applications but are augmented in service by a number of Soviet special purpose vehicles, a few Czech vehicles of the earlier TATRA range and some East German manufactured ROBUR LO-1800A and W50L vehicles.

In recent years the Polish motor industry has successfully produced a range of efficient road construction equipment, mobile cranes and modern truck prototypes (in which British Leyland engines, manufactured under licence in Poland, have been installed). At present, however, it appears that these vehicles have been produced almost exclusively for the civilian market and numbers are being exported to North Vietnam and to other countries with political sympathies towards the Warsaw Pact nations.

The Polish motor industry is centred in Jelcz (south of Wroclaw), Nysa, Starachowice in Central Poland, Lublin and Warsaw. Of these centres the Starachowice (STAR) factory is by far the most important producer of military vehicles, amongst them the STAR-66/660 series all wheel drive cross country trucks, the STAR-28 diesel engine and STAR-29 petrol driven, 5 tonne, cargo carrying, primarily road haulage, trucks, the STAR-200, 6 tonne cargo carrier, now being developed and its all wheel drive, cross country version STAR-244, still in the early development stages.

The Jelcz factory produces, primarily for the civilian market, buses and heavy cargo trucks such as the none too successful ZUBR A-80 and its 8 and 10½ tonne cargo carrying successors JELCZ-315 and JELCZ-316.

The Nysa factory manufactures light vehicles, for both military and commercial use, in load-carrying, minibus and ambulance versions whilst the Lublin factory manufactures similar, possibly rather improved, vehicles with the designation ZUK.

In spite of the variety of home-produced vehicle types, Polish production is yet insufficient to cover fully the military requirement. Hence we find the following Soviet vehicles in service in the Polish Army - the GAZ/UAZ-69 "jeep", URAL-375 (as carrier for the Soviet multiple rocket launcher BM-21), ZIL-135 (the launcher vehicle for the FROG-7 tactical surface-to-surface missile system), MAZ-543 (the launcher vehicle for the SCUD-B weapon system) and KrAZ-214/255B (as transporter for the folding Soviet bridging pontoon PMP).

The photographs and technical details which follow relate to some of the home-produced trucks now in service with the Polish Army, and those which may be taken into military use in due course. They are in no way intended to give a comprehensive cover of all Polish manufactured vehicles.

The Wheeled Vehicles of the Polish Army (cont'd)

The NYSA 501 range of vehicles was developed from the Warszawa car chassis. It is a multi-purpose series with front wheel drive and of all metal construction. The vehicles are fitted with either a 54 bhp or a 70 bhp engine. The series consists of:

- The NYSA F-501, supply truck with built on platform
- The NYSA S-501, ambulance version
- The NYSA M-501, minibus, and
- The NYSA T-501, a fast small load carrier

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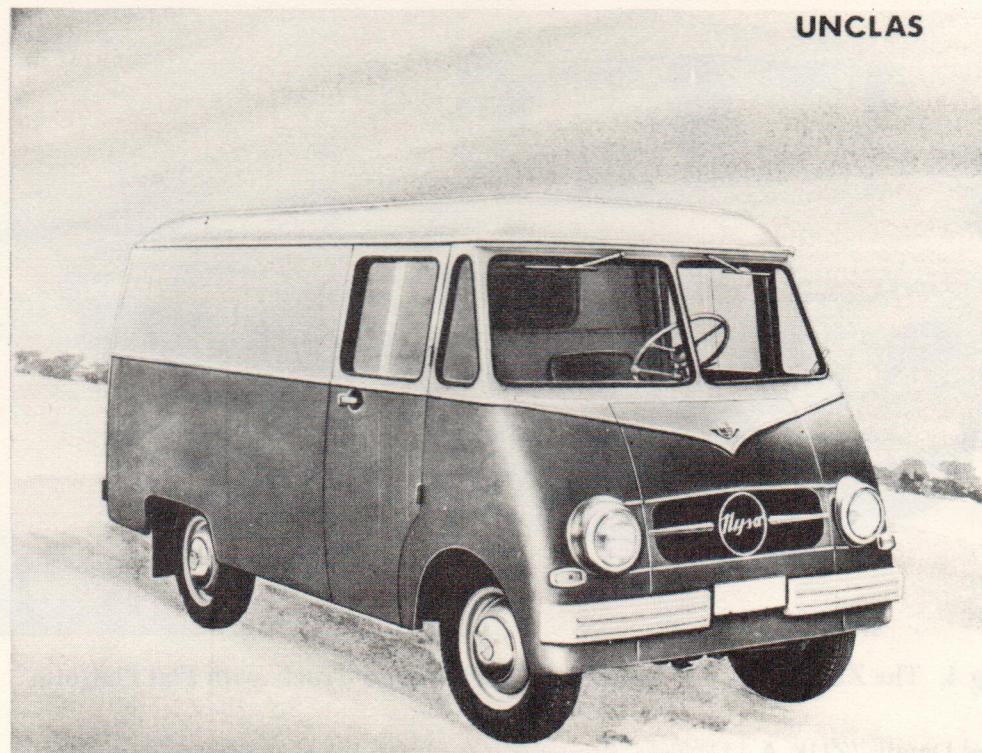


Fig 3. The NYSA T-501, 0.8 tonne, 4 x 2, Light Cargo Truck

Technical Details (NYSA T-501)

Kerb Weight:	1430 kg
Maximum Payload:	800 kg
Overall Length:	4410 mm
Overall Width:	1940 mm
Overall Height	2050 mm
Wheelbase:	2700 mm
Maximum track width:	1372 mm
Ground Clearance:	210 mm
Engine Type:	S-20/S-21, 4 cylinder, petrol engine, water cooled.
Brake Horse Power:	S-20: 54 bhp S-21: 70 bhp
Maximum Speed:	105 kph
Tyre Size:	6.50 x 16

The Wheeled Vehicles of the Polish Army (cont'd)

The ZUK series of small trucks has been developed along the lines of the Soviet UAZ-450 range; small cargo truck, minibus, van, ambulance etc. The first models of the A-03 series were fitted with the 54 bhp S-20 engine of the Warsaw Pact Forces whilst the later types were given the 70 bhp S-21 engine. A larger series with a longer wheelbase and 1½ tonne payload was also fitted with the 70 bhp engine and designated A-08.



Fig 4. The ZUK A-11, 0.9 tonne, 4 x 2 Light Cargo Truck with Flat Platform

Technical Details (ZUK A-11)

Kerb Weight:	1350 kg
Maximum Payload:	900 kg
Overall Length:	4445 mm
Overall Width:	1890 mm
Overall Height:	2100 mm
Wheelbase:	2700 mm
Maximum track width	1372 mm
Ground Clearance:	210 mm
Engine Type:	S-21, 4 cylinder petrol engine, water cooled.
Brake Horse Power:	70 bhp
Maximum Speed:	95 kph
Tyre Size:	6.50 x 16

The Wheeled Vehicles of the Polish Army (cont'd)

The STAR-66/660 series vehicles, developed primarily to meet military requirements, are modern all wheel drive trucks with three single-wheeled axles. These vehicles are found, in many varied versions using the same chassis, in all branches of the Polish Armed Forces. Used for bulk cargo carrying both on roads and cross country (where its load carrying capacity is reduced to 2½ tonnes), with a platform body for supplies and personnel, the series has also been modified as special purpose vehicles with box bodies for Command Posts, Communications and as Workshop vehicles. They are also used for towing guns and mine-clearing ploughs, as Chemical/Biological decontamination vehicles, as fuel bowsers and as mobile cranes, excavators and transporters for the TPP pontoon. From the STAR-66 basic vehicle the improved models STAR-660 M1 (figure 6) and STAR-660 M2 (figure 7) were developed. These have larger tyres, 12.00 x 18, than those of the earlier version.



Fig 5. The STAR-66, 4 tonne, 6 x 6, Cross Country Load Carrying Vehicle

Technical Details (STAR-66)

Kerb Weight:	5700 kg
Maximum Payload:	4000 kg (2500 kg cross country)
Overall Length:	6527 mm
Overall Width:	2400 mm
Overall Height:	2875 mm
Wheelbase:	2858 + 1200 mm
Maximum track width:	1804 mm
Ground Clearance	285 mm
Engine Type:	S-47, 6 cylinder, petrol engine, water cooled
Brake Horse Power:	105 bhp
Maximum Speed:	74 kph
Tyre Size:	11.00 x 20

The Wheeled Vehicles of the Polish Army (cont'd)

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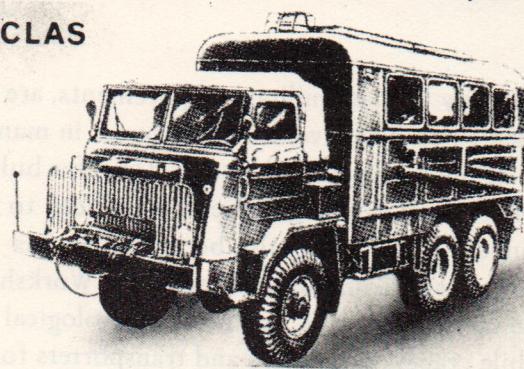
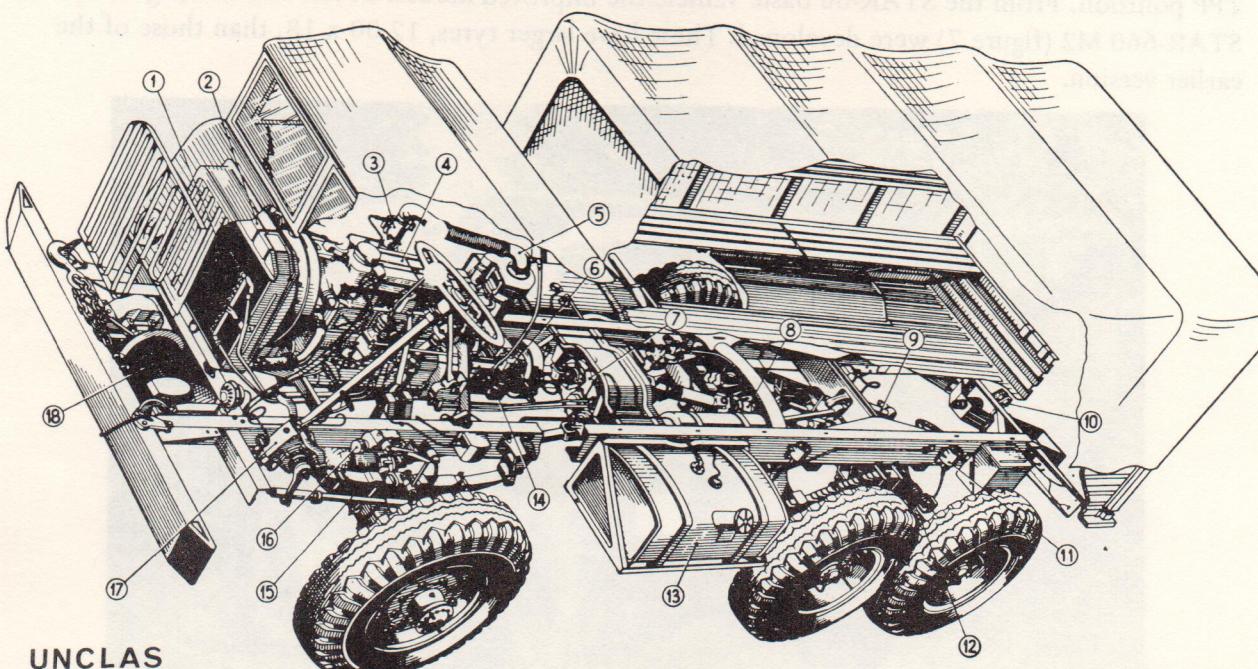


Fig 6. The STAR-660 M1, 4 tonne, 6 x 6, Cross Country Truck with Box Body as a Workshop Repair Vehicle



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Fig 7. The STAR-660 M2, 4 tonne, 6 x 6, Cross Country Truck (Sectional Diagram)

Legend

1. Oil Cooler	10. Tow Coupling
2. Water Cooling System	11. Shock Absorber
3. Carburettor	12. Rear Leaf Spring
4. Engine	13. Fuel Tank
5. Air Filter	14. Air Compressor
6. Gearbox	15. Front Leaf Spring
7. Power Drive Transmission	16. Shock Absorber
8. Differential Gearbox	17. Steering Box
9. Swing Arm	18. Winch

Recently the Starachowice factory has been working to improve the STAR series of two axle vehicles. The major step has been the introduction of the STAR-200 (4 x 2) and STAR-244 (4 x 4) restyled, higher powered vehicles both now under development. Until these vehicles go into production interim models STAR-28 and STAR-29 have been produced which incorporate the

The Wheeled Vehicles of the Polish Army (cont'd)

improved styling of the STAR-200 series but are powered by the 100 bhp diesel engine of the STAR-27 and the 95 bhp petrol engine of the STAR-25 respectively, and carry only a 5 tonne load against the 6 tonne payload of the 200 series.

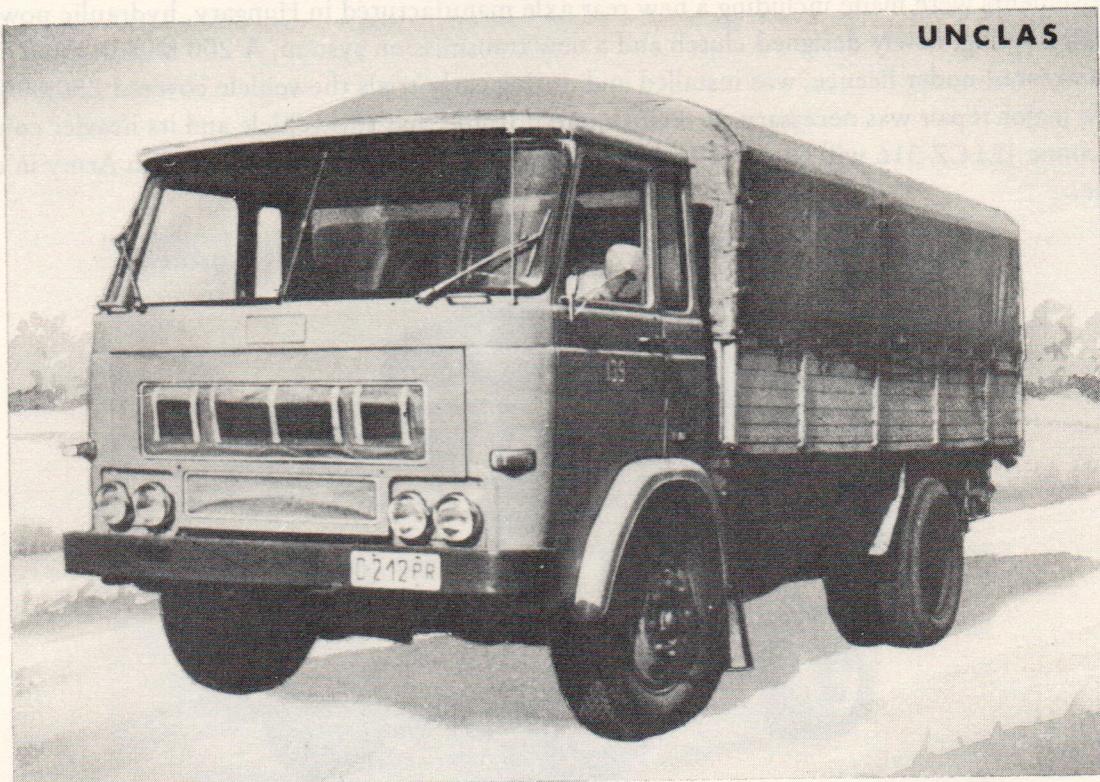


Fig 8. The STAR-29, 5 tonne, 4 x 2, Cargo Truck (Petrol driven)



Fig 9. The STAR-200, 6 tonne, 4 x 2, Cargo Truck (Diesel Engine)

The Wheeled Vehicles of the Polish Army (cont'd)

With the JELCZ-315 the new Polish development of a heavy load-carrying truck, primarily for civil purposes, has been realised. It was conceived as a successor to the ZUBR A-80 (produced in the same factory) which had proved unreliable and had an unsatisfactory performance. Significant improvements were made including a new rear axle manufactured in Hungary, hydraulic power assisted steering, newly designed clutch and a new transmission system. A 200 bhp Leyland engine, manufactured under licence, was installed and during early trials the vehicle covered 250,000 km before major repair was necessary. It seems quite possible that this vehicle and its heavier cousin the 10½ tonne JELCZ-316 will be taken into service, in small numbers, with the Polish Army in due course.



Fig 10. The JELCZ-315, 8 tonne, 4 x 2, Heavy Load Carrier

Technical Details

Kerb Weight:	6975 kg
Maximum Payload:	8000 kg
Overall Length:	7345 mm
Overall Width:	2500 mm
Overall Height:	3100 mm
Wheelbase:	4100 mm
Maximum track width:	2088 mm
Engine Type:	Leyland SW680/1, 6 cylinder in line diesel engine, fluid cooled.
Brake Horse Power:	200 bhp
Maximum Speed:	87-90 kph
Tyre Size:	11.00 x 20

The Wheeled Vehicles of the Polish Army (cont'd)

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Fig 11. The JELCZ-316, 10½ tonnes, 6 x 2, Heavy Load Carrier

Technical Details

Kerb Weight:	8180 kg
Maximum Payload:	10400 kg
Overall Length:	8820 mm
Overall Width:	2500 mm
Overall Height:	3100 mm
Wheelbase:	4115 + 1350 mm
Maximum track width:	2088 mm
Engine Type:	Leyland SW680/1, 6 cylinder in line diesel, fluid cooled.
Brake Horse Power:	200 bhp
Maximum Speed:	87-90 kph

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5. PMP Trackway

The obstacle crossing capabilities of Warsaw Pact Armies has recently been improved by the introduction of a folding metal trackway. It consists of 2 parallel rows of 1.2 m by 1.2 m links. The trackway is laid by separating the 2 rows to the required centre to centre spacing, lowering the off-loading mechanisms over the rear of the vehicle and feeding the plates under the rear wheels as shown, when the truck backs up. 38 plates in each row give a track-way length of approximately 46 m. The trackway is associated with the heavy folding pontoon bridge, PMP, and is assessed as having a capacity of 50 tons.

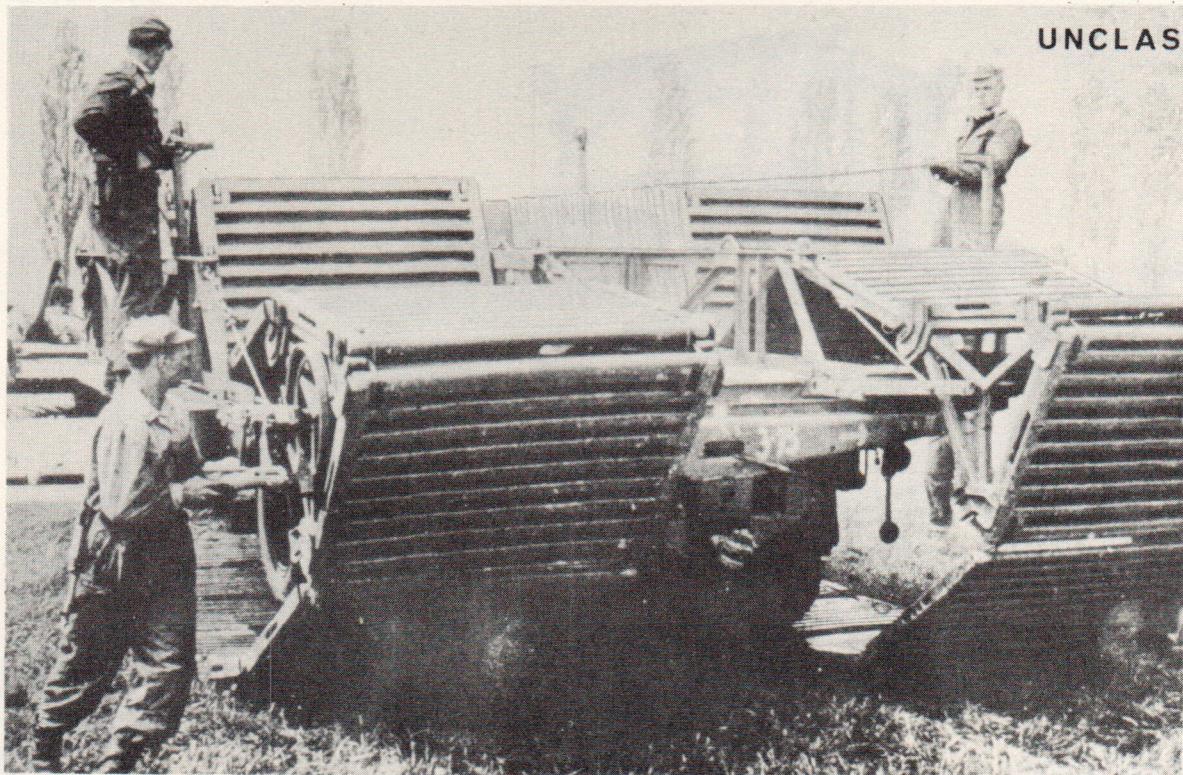


Fig 1. PMP Folding Metal Trackway

6. 2-Axle Wheeled Tractor, PKT

A recent addition to the Soviet Engineer Inventory is the wheeled bulldozer, PKT. Based on the 2-axled wheeled truck tractor MAZ-538, it has good cross-country performance, high road speeds and good traction characteristics. The blade can be set in 3 configurations: twin push-up (ie for snow clearing), bulldozer and grader. In addition, the blade can be twisted to an angle of up to 10° to right or left so that it can be used for clearing routes along sloping terrain. A float or "idiot shoe" may be provided to limit the depth of cut to 3-6 cm and so prevent over-heating of the hydraulic system. Its work capacity in digging shelter pits and in levelling work is 80-100m³ per hour and its maximum road speed is 45 km per hour.

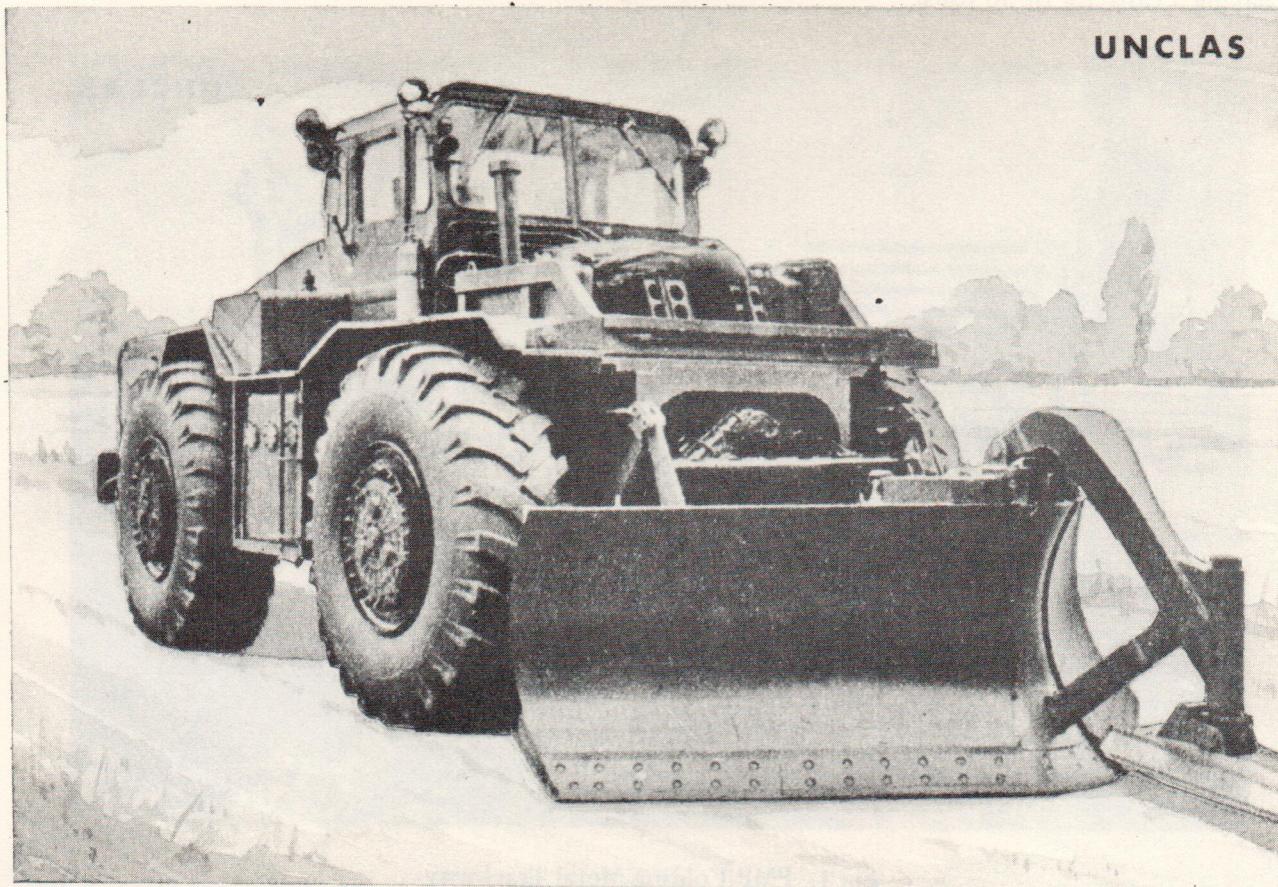


Fig 1. PKT 2-Axle Wheeled Tractor MAZ-538 with Dozer Blade

7. Foreign Army Equipment Quiz

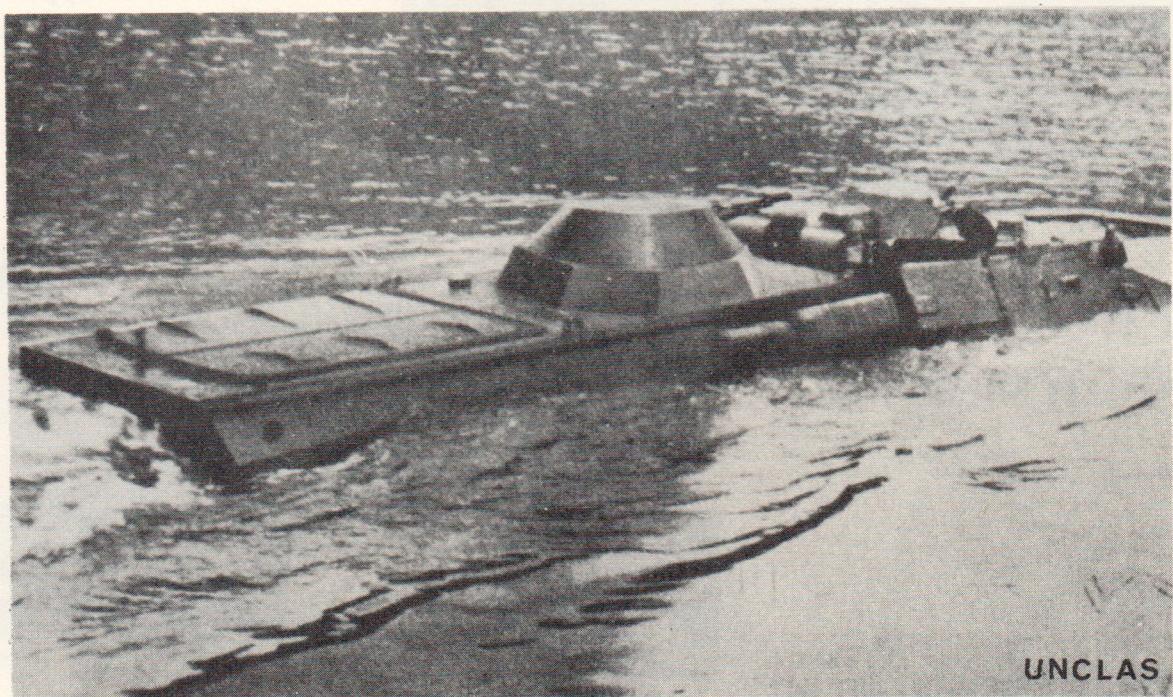


Fig 1. Wading or Swimming and what is it?



Fig 2. Shell or Rocket?

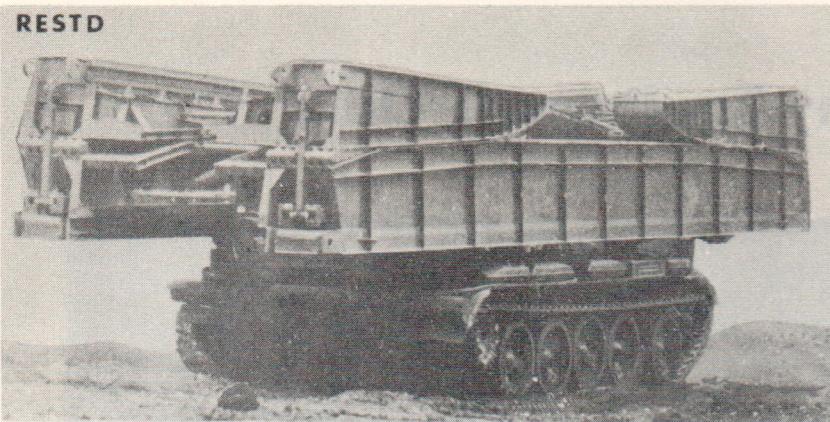


Fig 3.

The latest type
of Tank Armour?

Fig 4.

Soviet or CHICOM?



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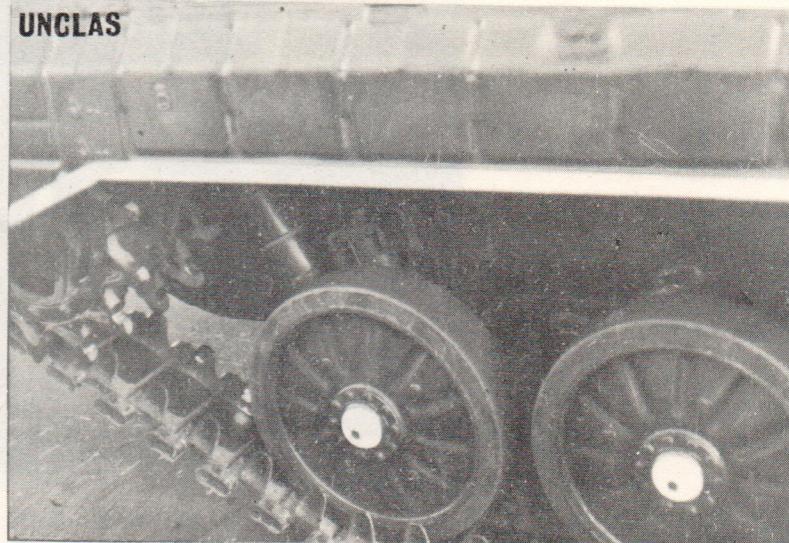


Fig 5.

Quite a common
sight... or is it?

Fig 6.

Night Viewing Device?



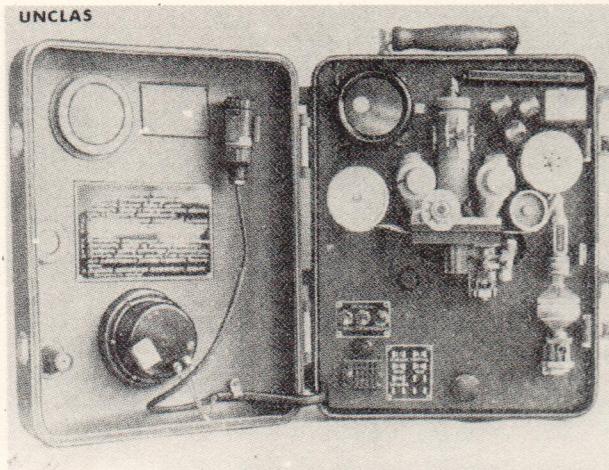


Fig 7.

A Tape Recorder.
No ... but what is it?

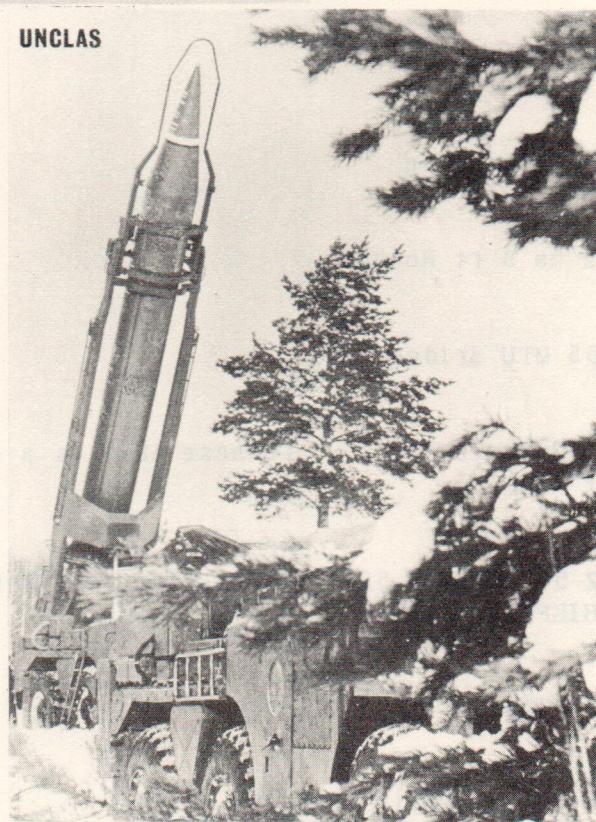


Fig 8. It is not HONEST JOHN - what is it?



Fig 9.

Joint Planning
Gone Mad!

Can you name the
two major equipments?

Foreign Army Equipment Quiz

Answers

Fig. 1. - OT-64 Swimming

Fig 2. - 122 mm 6 ft Rocket

Fig 3. - T-55 MTU Bridge

Fig 4. - R 113 Soviet Radio. Chinese A220 is a copy of this

Fig 5. - MAZ 537/ChMZAP 5247 Transporter carrying CHIEFTAIN tank.

Fig 6. - BMP Suspension

Fig 7. - GSP-1M Automatic Chemical Alarm

Fig 8. - SCUD-B Missile

Fig 9. - Mockup of Bell Huie Cobra and SU-100